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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/965,803	10/01/2001	Kazuhiro Tanaka	401384	3457
23548	7590	11/17/2004	EXAMINER	
LEYDIG VOIT & MAYER, LTD 700 THIRTEENTH ST. NW SUITE 300 WASHINGTON, DC 20005-3960			CULBERT, ROBERTS P	
			ART UNIT	PAPER NUMBER
			1763	

DATE MAILED: 11/17/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/965,803

Applicant(s)

TANAKA, KAZUHIRO

Examiner

Roberts Culbert

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 14 May 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 14-20 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 14-20 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 01 October 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- ☐ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 5/14/04.
- ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- ☐ Notice of Informal Patent Application (PTO-152)
- ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 10/15/04 has been entered.

Response to Arguments

Applicant's arguments filed 5/14/04 have been fully considered but they are not persuasive.

1. Applicant has argued that the particle size distribution sensor 31 in Yueh does not measure particle information of the slurry being supplied to and directly used in the polishing apparatus because Yueh's sensor 31 is not located in the conduit 33 leading to the polishing apparatus.

The argument is not persuasive because the sensor of Yueh is located in tank 29, which feeds directly into conduit 33 leading to the polishing apparatus.

2. Applicant has argued that the slurry drawn from Yueh's tank 29 is not the slurry being supplied to and directly used in polishing the object in the polishing apparatus.

The argument is not persuasive. Even though the slurry in tank 29 may be mixed with fresh slurry at valve 49, the slurry from tank 29 is "directly used" in polishing the object since the slurry from tank 29 may pass only from tank 29 to conduit 33 and through valves 49 and 34 to the object. Note that the term "directly used" may be broadly interpreted to mean that the slurry follows a specific line or course to the object.

3. Applicant has argued that Yueh does not contain an enabling disclosure as to the points essential to the rejection and, therefore, cannot properly be considered prior art.

The argument is not persuasive because one of ordinary skill in the art of process control would be intimately familiar with the operation of valves and controllers. Further specifics of controller 41, end-point monitor 40 and valve 49 are not essential to the rejection as recited below.

4. Applicant has argued that there is no description in Yueh, either in the text or in the figures, indicating disposal of any slurry or of any discharge vent or opening. This omission further demonstrates the failure of Yueh to present an enabling disclosure as to this point and reinforces the fact that Yueh cannot be considered prior art.

The argument is not persuasive because Yueh both describes in the text and clearly illustrates a three-way valve.

5. Applicant has argued that Yueh does not teach controlling polishing speed based upon particle information.

The examiner agrees that the passages cited in the previous office action do not teach the method of the present invention as claimed. However, the argument is moot in view of the rejection as recited below. Specifically, Yueh teaches that the particle size distribution sensor (31) is used to control the size distribution in tank (29) via valve (43). See Col. 3, Lines 34-37. As one of ordinary skill in the art appreciates, the particle size distribution directly affects the polishing rate (speed and time). Therefore the particle size information collected by sensor is used to control the polishing speed at which the object is being polished.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 14, 15, and 17-20 are rejected under 35 U.S.C. 102(b) as being anticipated by U.S. Patent 5,791,970 to Yueh.

Regarding Claims 14 and 20, Yueh teaches a method of chemical mechanical polishing of an object comprising: supplying a slurry to a polishing apparatus including a polisher and the object to be polished; (Figure 2 and Col. 2, Lines 55-60) measuring particle information, including at least one of dispersion of particles and distribution of particle sizes (Figure 4 and Col. 3, Line 57-Col. 4, Line 20), of the slurry being supplied to and directly used in polishing of the object in polishing apparatus; and controlling polishing speed and time, based on the particle information. Note that the slurry is supplied to the polishing apparatus (Figure 2) through return conduit (33). Yueh also teaches controlling polishing speed based upon the particle information in the slurry. Yueh states that the particle size distribution sensor (31) is used to control the size distribution in tank (29) via valve (43). See Col. 3, Lines 34-37. As one of ordinary skill in the art appreciates, the particle size distribution directly affects the polishing rate (speed and time). Therefore the particle size information collected by sensor is used to control the polishing speed at which the object is being polished.

Regarding Claim 15, Yueh teaches controlling the polishing speed by adjusting a physical variable of the polisher. For example, particle size distribution is considered to be a physical variable of the polisher.

Regarding Claim 17, Yueh teaches supplying a mixture (29) of a first slurry (25) and a second slurry (30) to the polishing apparatus as the slurry.

Regarding Claim 18, Yueh teaches controlling mixing ratio between the first slurry and the second slurry on the particle information. (Col. 3, Lines 8-13)

Regarding Claim 19, Yueh teaches detecting the polishing speed at which the object is polished; and controlling the mixing ratio based on the polishing speed. (Col. 3, Lines 17-22) Note that the instantaneous wafer removal rate is the polishing speed of the object.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claim 16 is rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent 5,791,970 to Yueh in view of U.S. Patent 6,383,332 to Shelton.

As applied above, Yueh teaches the method of the invention substantially as claimed, but does not teach that the physical variable is at least one of a rotation speed of the polisher, rotation speed of the object, and force applied by the polisher to the object.

Referring to figures 2, and 3, Shelton teaches a method of chemical mechanical polishing (CMP) comprising: supplying a slurry (268), and polishing an object (100) with particles contained in the slurry, including controlling a physical quantity which is a determinant factor of a polishing speed with respect to the object, based on information on the particles contained in the slurry. Note: the information on the particles contained in the slurry is received by controller (280) from sensor (276). The controller (280) adjusts pressure on the polishing pad (282), pad speed (283), plate speed (284), slurry flow (287) etc.

Shelton also teaches a step of controlling polishing time based on information on the particles contained in the slurry. (Col.1, Lines 3-5)

It would have been obvious to one of ordinary skill in the art at the time of invention to control the polishing speed by adjusting a physical variable such as rotation speed of the polisher, rotation speed of the object, or force applied by the polisher to the object.

One of ordinary skill in the art would have been motivated at the time of invention to control the polishing speed in the method of Yueh by adjusting a physical variable such as rotation speed of the polisher, rotation speed of the object, or force applied by the polisher as shown in Shelton since Shelton teaches that adjusting a physical variable such as rotation speed of the polisher, rotation speed of the

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object, or force applied by the polisher is a suitable method for controlling polishing speed based on information obtained from particles contained within a polishing slurry.


Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Roberts Culbert whose telephone number is (571) 272-1433. The examiner can normally be reached on Monday-Friday (7:30-4:00).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gregory Mills can be reached on (571) 272-1439. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

R. Culbert



REGISTRY
PATENT EXAMINER
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